

## ABSTRACT

Instead of soldering a circuit board or substrate to a nickel-plated aluminum heat sink for solid state relay applications, the present invention utilizes ultrasonic welding 5 to weld a copper foil to a non-nickel-plated aluminum heat sink. The circuit board or substrate is subsequently soldered to the copper foil. The superior solderability of copper foil brings increased solder coverage between the heat sink and substrate, improving the heat transfer from the output switching 10 element to the heat sink. This method eliminates the need for fixturing since the copper foil is surrounded by non-nickel-plated aluminum that is non-solderable by commonly used solders. This method also eliminates the high costs associated 15 with nickel-plating and hazardous waste disposal, since no chemical wastes are produced. With this method, the same size solid state relay is now able to carry more current due to the better heat transfer and heat dissipation capabilities.